

1 1. Method of structurally converting a binary sequence into an encrypted final image
2 *G*, the structural conversion comprising the steps of:
3
4 forming an image *M* of the binary sequence as a concatenation of a tag data
5 element *T* and structural data element *S*, tag data element *T* comprising
6 information necessary to reverse a conversion process, structural data element *S*
7 comprising a sequence of logical scales of position coding;
8
9 selecting a number of conversion function iterations *P* to be performed;
10
11 iteratively executing *P* times a conversion function comprised of the following
12 steps:
13 selecting a transformation algorithm *A* from a predefined set of
14 transformation algorithms *L*;
15 selecting an alphabet of transformation *AV* based upon the structural data
16 element *S*;
17 applying algorithm *A* and alphabet *AV* to structural data element *S* to form
18 a plurality of logical scales of position coding;
19 forming a transformed structural data element *S'* comprised of a sequence
20 of the logical scales of position coding;
21 selecting an external key *K^x*;
22 forming tag data element *T*;
23 coding the tag data element *T* with external key *K^x* to obtain coded tag
24 data element *T''*;
25 repeating the steps of the conversion function upon a converted image *M'*
26 comprised of a concatenation of the coded tag data element *T''* and
27 the transformed structural data element *S'*;
28
29 and forming the encrypted final image *G* as a concatenation of the coded tag data
30 element *T''* and the transformed structural data element *S'* created upon the *Pth*

iteration of the conversion function.

2.

Method of structurally converting a binary sequence into an encrypted final image G , said structural conversion comprising the steps of:

forming an image M of the binary sequence as a concatenation of a tag data element T and structural data element S , tag data element T comprising information necessary to reverse the conversion process, structural data element S comprising a sequence of logical scales of position coding;

selecting a number of conversion function iterations P to be performed;

iteratively executing P times a conversion function comprised of the following steps:

- selecting a transformation algorithm A from a predefined set of transformation algorithms L ;
- selecting an alphabet of transformation AV based upon the structural data element S ;
- applying algorithm A and alphabet AV to structural data element S to form a plurality of logical scales of position coding;
- forming a transformed structural data element S' comprised of a sequence of the logical scales of position coding;
- stochastically selecting a bit length parameter and a shift parameter which define an internal identifier K within transformed structural data element S' ;
- forming tag data element T ;
- coding a portion of the tag data element T with internal identifier K to obtain a partially coded tag data element T' ;
- selecting an external key K^x ;
- coding the partially coded tag data element T' with external key K^x to

1 obtain coded tag data element T'' ;

2 determining whether to extract internal identifier K from

3 transformed structural data element S' , and if determined

4 necessary, extracting the internal identifier K from transformed

5 structural data element S' to obtain structural data element S'' and

6 storing internal identifier K in a file of internal identifiers FID ;

7 repeating the steps of the conversion function upon a converted image M'

8 comprised of a concatenation of the coded tag data element T'' and

9 either transformed structural data element S' if internal identifier K

10 was not extracted, or structural data element S'' if internal identifier

11 K was extracted;

12

13 and forming the encrypted final image G as a concatenation of the coded tag

14 data element T'' and either transformed structural data element S' if internal

15 identifier K was not extracted, or structural data element S'' if internal

16 identifier K was extracted.

17

18 3. Method of structurally converting a binary sequence into an encrypted final image

19 G , said structural conversion comprising the steps of:

20

21 forming an image M of the binary sequence as a concatenation of a tag data

22 element T and structural data element S , tag data element T comprising

23 information necessary to reverse the conversion process, structural data element S

24 comprising a sequence of logical scales of position coding;

25

26 selecting a number of conversion function iterations P to be performed;

27

28 iteratively executing P times a conversion function comprised of the following

29 steps:

30 selecting a transformation algorithm A from a predefined set of

1 transformation algorithms L ;
2 selecting an alphabet of transformation AV based upon the structural data
3 element S ;
4 applying algorithm A and alphabet AV to structural data element S to form
5 a plurality of logical scales of position coding;
6 forming a transformed structural data element S' comprised of a sequence
7 of the logical scales of position coding;
8 stochastically selecting a bit length parameter and a shift parameter which
9 define an internal identifier K within transformed structural data
10 element S' ;
11 scrambling internal identifier K with a scrambling function to obtain a
12 scrambled internal identifier K' ;
13 forming tag data element T ;
14 coding a portion of the tag data element T with scrambled internal
15 identifier K' to obtain a partially coded tag data element T' ;
16 selecting an external key K^x ;
17 coding the partially coded tag data element T' with external key K^x to
18 obtain coded tag data element T'' ;
19 determining whether to extract internal identifier K from
20 transformed structural data element S' , and if determined
21 necessary, extracting the internal identifier K from transformed
22 structural data element S' to obtain structural data element S'' and
23 storing scrambled internal identifier K' in a file of internal
24 identifiers FID ;
25 repeating the steps of the conversion function upon a converted image M'
26 comprised of a concatenation of the coded tag data element T'' and
27 either transformed structural data element S' if internal identifier K
28 was not extracted, or structural data element S'' if internal
29 identifier K was extracted;
30

1 and forming the encrypted final image G as a concatenation of the coded tag data
2 element T'' and either transformed structural data element S' if internal identifier
3 K was not extracted, or structural data element S'' if internal identifier K was
4 extracted.

5

6 4. The method of claim 2, further comprising the steps of:

7

8 structurally converting the file of internal identifiers FID to obtain a converted file
9 of internal identifiers FID' , wherein a tag data element formed during the
10 structural conversion of the file of internal identifiers FID is coded with an
11 external key selected stochastically from a multitude of external keys in an
12 external key file K_{EXT} ; and

13

14 optionally transmitting the encrypted final image G and structurally converted file
15 of internal identifiers FID' to a subscriber or receiver.

16

17 5. The method of claim 1, wherein the external key K^x is selected from a multitude
18 of external keys in an external key file K_{EXT} .

19

20 6. The method of claim 1, wherein the selection of external key K^x is a stochastic
21 selection.

22

23 7. The method of claim 1, wherein a same external key K^x is selected for use in all
24 iterations.

25

26 8. The method of claim 1, wherein a different external key K^x is selected upon each
27 iteration.

28

29 9. The method of claim 1, wherein the external key K^x is entered by a user during the
30 conversion and reverse conversion process.

1

2 10. The method of claim 5, further comprising the steps of:

3

4 structurally converting the external key file K_{EXT} to obtain a structurally converted

5 external key file; and

6

7 transmitting to a subscriber the structurally converted external key file and an

8 initial key K_{INIT} required to reverse the structural conversion of the structurally

9 converted external key file to obtain the external key file K_{EXT} .

10

11 11. The method of claim 1, wherein the selection of transformation algorithm A may

12 be a stochastic selection.

13

14 12. The method of claim 1, wherein the selection of transformation algorithm A may

15 depend upon adherence to a mathematical criterion.

16

17 13. The method of claim 1, wherein the selection of transformation algorithm A may

18 depend upon adherence to a logical criterion.

19

20 14. The method of claim 1, wherein the selection of transformation algorithm A may

21 depend upon adherence to a file size criteria for encrypted final image G .

22

23 15. The method of claim 1, wherein the predefined set of transformation algorithms L

24 may be supplemented.

25

26 16. The method of claim 1, wherein the selection of a number of conversion steps P

27 may be a stochastic selection.

28

29 17. The method of claim 1, wherein the selection of a number of conversion steps P

30 may depend upon adherence to a mathematical criterion.

1 18. The method of claim 1, wherein the selection of a number of conversion steps P
2 may depend upon adherence to a logical criterion.
3
4 19. The method of claim 1, wherein the selection of a number of conversion steps P
5 may depend upon adherence to a file size criteria for encrypted final image G .
6
7 20. The method of claim 1, wherein the alphabet of transformation AV is comprised
8 of letters or quants, each letter or quant comprising a segment of structural data
9 element S .
10
11 21. The method of claim 2, further comprising the step of determining upon which
12 iterations, if any, internal identifiers are to be extracted.
13
14 22. The method of claim 3, further comprising the step of determining upon which
15 iterations, if any, internal identifiers are to be extracted.
16
17 23. The method of claim 20, wherein a number of bits in each letter or quant is
18 stochastically selected.
19
20 24. The method of claim 20, wherein a number of bits in each letter or quant may
21 depend upon adherence to a mathematical criterion.
22
23 25. The method of claim 20, wherein a number of bits in each letter or quant may
24 depend upon adherence to a logical criterion.
25
26 26. The method of claim 20, wherein a number of bits in each letter or quant may
27 depend upon adherence to a file size criteria for encrypted final image G .
28

1 27. The method of claim 1, wherein the information necessary to reverse the
2 conversion process stored in tag data element T may comprise one or more of the
3 following:

4

5 an indicator of whether a current iterative step is the P^{th} iteration;
6
7 an indicator of whether the selected external key K^x is to be used for all P
8 iterations;
9 an indicator of the selected external key K^x ;
10
11 an indicator of the selected transformation algorithm A ;
12
13 a length of a first logical scale of position coding;
14 an indicator of user information;
15
16 the alphabet of transformation AV ; and
17
18 other transformation algorithm A parameters.

19
20 28. The method of claim 2, wherein the information necessary to reverse the
21 conversion process stored in tag data element T may comprise one or more of the
22 following:

23

24 an indicator of whether a current iterative step is the P^{th} iteration;
25
26 an indicator of whether the selected external key K^x is to be used for all P
27 iterations;
28
29 an indicator of the selected external key K^x ;

30

1 an indicator of the selected transformation algorithm A ;

2 an indicator of user information;

3

4 the alphabet of transformation AV ;

5

6 a length of a first logical scale of position coding;

7

8 other transformation algorithm A parameters;

9

10 the bit internal identifier K length and shift parameters; and

11 an indicator of internal identifier K extraction.

12

13 29. The method of claim 3, wherein the information necessary to reverse the

14 conversion process stored in tag data element T may comprise one or more of the

15 following:

16

17 an indicator of whether a current iterative step is the P^h iteration;

18

19 an indicator of whether the selected external key K^x is to be used for all P

20 iterations;

21

22 an indicator of the selected external key K^x ;

23

24 an indicator of the selected transformation algorithm A ;

25 an indicator of user information;

26

27 the alphabet of transformation AV ;

28

29 a length of a first logical scale of position coding;

30

1 other transformation algorithm A parameters;

2

3 an indicator of the scrambling function selected;

4

5 the bit internal identifier K length and shift parameters; and

6

7 an indicator of internal identifier K extraction.

8

9 30. The method of claim 3, wherein the scrambling function is selected from a

10 scrambling matrix comprised of a predefined set of scrambling functions.

11

12 31. The method of claim 30, wherein the predefined set of scrambling functions is

13 changed periodically.

14

15 32. The method of claim 1, wherein the conversion function further comprises the

16 step of:

17 determining whether to insert user information into structural data element S , and

18 inserting user information into structural data element S if determined necessary,

19 thereby providing a means for user authentication and digital signing.

20

21 33. The method of claim 2, wherein the conversion function further comprises the

22 step of:

23 determining whether to insert user information into structural data element S , and

24 inserting user information into structural data element S if determined necessary,

25 thereby providing a means for user authentication and digital signing.

26

27 34. The method of claim 3, wherein the conversion function further comprises the

28 step of:

1 determining whether to insert user information into structural data element S , and
2 inserting user information into structural data element S if determined necessary,
3 thereby providing a means for user authentication and digital signing.

4

5 35. Computer executable process steps stored on a computer readable medium, the
6 computer executable process steps for structurally converting a binary sequence
7 into an encrypted final image G , the computer executable process steps
8 comprising:

9

10 forming an image M of the binary sequence as a concatenation of a tag data
11 element T and structural data element S , tag data element T comprising
12 information necessary to reverse a conversion process, structural data element S
13 comprising a sequence of logical scales of position coding;

14

15 selecting a number of conversion steps P to be performed;

16

17 iteratively executing P times a conversion function comprised of the following
18 steps:

19 selecting a transformation algorithm A from a predefined set of
20 transformation algorithms L ;

21 selecting an alphabet of transformation AV based upon the structural data
22 element S ;

23 applying algorithm A and alphabet AV to structural data element S to form
24 a plurality of logical scales of position coding;

25 forming a transformed structural data element S' comprised of a sequence
26 of the logical scales of position coding;

27 selecting an external key K^x ;

28 forming tag data element T ;

29 coding the tag data element T with external key K^x to obtain coded tag
30 data element T'' ;

1 repeating the steps of the conversion function upon a converted image M'
2 comprised of a concatenation of the coded tag data element T'' and the
3 transformed structural data element S' ;

4

5 and forming the encrypted final image G as a concatenation of the coded tag data
6 element T'' and the transformed structural data element S' created upon the P^h
7 iteration of the conversion function.

8

9 36. Computer executable process steps stored on a computer readable medium, the
10 computer executable process steps for structurally converting a binary sequence
11 into an encrypted final image G , the computer executable process steps
12 comprising:

13

14 forming an image M of the binary sequence as a concatenation of a tag data
15 element T and structural data element S , tag data element T comprising
16 information necessary to reverse the conversion process, structural data element S
17 comprising a sequence of logical scales of position coding;

18

19 selecting a number of conversion steps P to be performed;

20

21 iteratively executing P times a conversion function comprised of the following
22 steps:

23 selecting a transformation algorithm A from a predefined set of
24 transformation algorithms L ;

25 selecting an alphabet of transformation AV based upon the structural data
26 element S ;

27 applying algorithm A and alphabet AV to structural data element S to form
28 a plurality of logical scales of position coding;

29 forming a transformed structural data element S' comprised of a sequence
30 of the logical scales of position coding;

1 stochastically selecting a bit length parameter and a shift parameter which
2 define an internal identifier K within transformed structural data
3 element S' ;
4 forming tag data element T ;
5 coding a portion of the tag data element T with internal identifier K to
6 obtain a partially coded tag data element T' ;
7 selecting an external key K^x ;
8 coding the partially coded tag data element T' with external key K^x to
9 obtain coded tag data element T'' ;
10 stochastically determining whether to extract internal identifier K from
11 transformed structural data element S' , and if determined
12 necessary, extracting the internal identifier K from transformed
13 structural data element S' to obtain structural data element S''' and
14 storing internal identifier K in a file of internal identifiers FID ;
15 performing the steps of the conversion function upon a converted image
16 M' comprised of a concatenation of the coded tag data element T''
17 and either transformed structural data element S' if internal
18 identifier K was not extracted, or structural data element S''' if
19 internal identifier K was extracted;
20
21 and forming the encrypted final image G as a concatenation of the coded tag data
22 element T'' and either transformed structural data element S' if internal identifier
23 K was not extracted, or structural data element S''' if internal identifier K was
24 extracted.

25

26 37. Computer executable process steps stored on a computer readable medium, the
27 computer executable process steps for structurally converting a binary sequence
28 into an encrypted final image G , the computer executable process steps
29 comprising:

30

1 forming an image M of the binary sequence as a concatenation of a tag data
2 element T and structural data element S , tag data element T comprising
3 information necessary to reverse the conversion process, structural data element S
4 comprising a sequence of logical scales of position coding;

5

6 selecting a number of conversion steps P to be performed;

7

8 iteratively executing P times a conversion function comprised of the following
9 steps:

10 selecting a transformation algorithm A from a predefined set of
11 transformation algorithms L ;

12 selecting an alphabet of transformation AV based upon the structural data
13 element S ;

14 applying algorithm A and alphabet AV to structural data element S to form
15 a plurality of logical scales of position coding;

16 forming a transformed structural data element S' comprised of a sequence
17 of the logical scales of position coding;

18 stochastically selecting a bit length parameter and a shift parameter which
19 define an internal identifier K within transformed structural data
20 element S' ;

21 scrambling internal identifier K with a scrambling function to obtain a
22 scrambled internal identifier K' ;

23 forming tag data element T ;

24 coding a portion of the tag data element T with scrambled internal
25 identifier K' to obtain a partially coded tag data element T' ;

26 selecting an external key K^x ;

27 coding the partially coded tag data element T' with external key K^x to
28 obtain coded tag data element T'' ;

29 stochastically determining whether to extract internal identifier K from
30 transformed structural data element S' , and if determined

1 necessary, extracting the internal identifier K from transformed
2 structural data element S' to obtain structural data element S'' and
3 storing scrambled internal identifier K' in a file of internal
4 identifiers FID ;
5 performing the steps of the conversion function upon a converted image
6 M' comprised of a concatenation of the coded tag data element T''
7 and either transformed structural data element S' if internal
8 identifier K was not extracted, or structural data element S'' if
9 internal identifier K was extracted;
10
11 and forming the encrypted final image G as a concatenation of the coded tag data
12 element T'' and either transformed structural data element S' if internal identifier
13 K was not extracted, or structural data element S'' if internal identifier K was
14 extracted.
15
16 38. The computer executable process steps stored on a computer readable medium of
17 claim 35, wherein the external key K^x is selected from a multitude of external
18 keys in an external key file K_{EXT} .
19
20 39. The computer executable process steps stored on a computer readable medium of
21 claim 35, wherein the selection of the external key K^x is a stochastic selection.
22
23 40. The computer executable process steps stored on a computer readable medium of
24 claim 35, wherein a same external key K^x is selected for use in all iterations.
25
26 41. The computer executable process steps stored on a computer readable medium of
27 claim 35, wherein a different external key K^x is selected upon each iteration.
28

1 42. The computer executable process steps stored on a computer readable medium of
2 claim 35, wherein the external key K^x is entered by a user during the conversion
3 and reverse conversion process.

4

5 43. The computer executable process steps stored on a computer readable medium of
6 claim 35, wherein the selection of transformation algorithm A may be a stochastic
7 selection.

8

9 44. The computer executable process steps stored on a computer readable medium of
10 claim 35, wherein the selection of transformation algorithm A may depend upon
11 adherence to a mathematical criterion.

12

13 45. The computer executable process steps stored on a computer readable medium of
14 claim 35, wherein the selection of transformation algorithm A may depend upon
15 adherence to a logical criterion.

16

17 46. The computer executable process steps stored on a computer readable medium of
18 claim 35, wherein the selection of transformation algorithm A may depend upon
19 adherence to a file size criteria for encrypted final image G .

20

21 47. The computer executable process steps stored on a computer readable medium of
22 claim 35, wherein the predefined set of transformation algorithms L may be
23 supplemented.

24

25 48. The computer executable process steps stored on a computer readable medium of
26 claim 35, wherein the selection of a number of conversion steps P may be a
27 stochastic selection.

28

1 49. The computer executable process steps stored on a computer readable medium of
2 claim 35, wherein the selection of a number of conversion steps P may depend
3 upon adherence to a mathematical criterion.
4

5 50. The computer executable process steps stored on a computer readable medium of
6 claim 35, wherein the selection of a number of conversion steps P may depend
7 upon adherence to a logical criterion.
8

9 51. The computer executable process steps stored on a computer readable medium of
10 claim 35, wherein the selection of a number of conversion steps P may depend
11 upon adherence to a file size criteria for encrypted final image G .
12

13 52. The computer executable process steps stored on a computer readable medium of
14 claim 35, wherein the alphabet of transformation AV is comprised of letters or
15 quants, each letter or quant comprising a segment of structural data element S .
16

17 53. The computer executable process steps stored on a computer readable medium of
18 claim 52, wherein a number of bits in each letter or quant is stochastically
19 selected.
20

21 54. The computer executable process steps stored on a computer readable medium of
22 claim 52, wherein a number of bits in each letter or quant may depend upon
23 adherence to a mathematical criterion.
24

25 55. The computer executable process steps stored on a computer readable medium of
26 claim 52, wherein a number of bits in each letter or quant may depend upon
27 adherence to a logical criterion.
28

1 59. The computer executable process steps stored on a computer readable medium of
2 claim 37, wherein the information necessary to reverse the conversion process
3 stored in tag data element T may comprise one or more of the following:
4 an indicator of whether a current iterative step is the P^{th} iteration;
5 an indicator of whether the selected external key K^x is to be used for all P
6 iterations;
7 an indicator of the selected external key K^x ;
8 an indicator of the selected transformation algorithm A ;
9 the alphabet of transformation AV ;
10 a length of a first logical scale of position coding;
11 other transformation algorithm A parameters;
12 an indicator of the scrambling function selected;
13 internal identifier K bit length and shift parameters; and
14 an indicator of internal identifier K extraction.
15
16 60. The computer executable process steps stored on a computer readable medium of
17 claim 37, wherein the scrambling function is selected from a scrambling matrix
18 comprised of a predefined set of scrambling functions.
19
20 61. The computer executable process steps stored on a computer readable medium of
21 claim 60, wherein the predefined set of scrambling functions is changed
22 periodically.
23
24 62. An apparatus for structurally converting a binary sequence into an encrypted final
25 image G , comprising:
26
27 a memory element for storing computer executable process steps;
28
29 a processor for executing computer executable process steps;
30

1 computer executable process steps comprising:

2

3 forming an image M of the binary sequence as a concatenation of a tag

4 data element T and structural data element S , tag data element T

5 comprising information necessary to reverse a conversion process,

6 structural data element S comprising a sequence of logical scales of

7 position coding;

8

9 selecting a number of conversion steps P to be performed;

10

11 iteratively executing P times a conversion function comprised of the

12 following steps:

13 selecting a transformation algorithm A from a predefined set of

14 transformation algorithms L ;

15 selecting an alphabet of transformation AV based upon the

16 structural data element S ;

17 applying algorithm A and alphabet AV to structural data element S

18 to form a plurality of logical scales of position coding;

19 forming a transformed structural data element S' comprised of a

20 sequence of the logical scales of position coding;

21 selecting an external key K^x ;

22 forming tag data element T ;

23 coding the tag data element T with external key K^x to obtain coded

24 tag data element T'' ;

25 repeating the steps of the conversion function upon a converted

26 image M' comprised of a concatenation of the coded tag

27 data element T'' and the transformed structural data element

28 S' ;

1 and forming the encrypted final image G as a concatenation of the coded
2 tag data element T'' and the transformed structural data element S' created
3 upon the P^h iteration of the conversion function.

4

5 63. An apparatus for structurally converting a binary sequence into an encrypted final
6 image G , comprising:

7

8 a memory element for storing computer executable process steps;

9

10 a processor for executing computer executable process steps;

11

12 computer executable process steps comprising:

13 forming an image M of the binary sequence as a concatenation of a tag
14 data element T and structural data element S , tag data element T
15 comprising information necessary to reverse the conversion process,
16 structural data element S comprising a sequence of logical scales of
17 position coding;

18 selecting a number of conversion steps P to be performed;

19

20 iteratively executing P times a conversion function comprised of the
21 following steps:

22 selecting a transformation algorithm A from a predefined set of
23 transformation algorithms L ;

24 selecting an alphabet of transformation AV based upon the
25 structural data element S ;

26 applying algorithm A and alphabet AV to structural data element S
27 to form a plurality of logical scales of position coding;

28 forming a transformed structural data element S' comprised of a
29 sequence of the logical scales of position coding;

30 stochastically selecting a bit length parameter and a shift parameter

which define an internal identifier K within transformed structural data element S' ;

forming tag data element T ;

coding a portion of the tag data element T with internal identifier K to obtain a partially coded tag data element T' ;

selecting an external key K^x ;

coding the partially coded tag data element T' with external key K^x to obtain coded tag data element T'' ;

stochastically determining whether to extract internal identifier K from transformed structural data element S' , and if determined necessary, extracting the internal identifier K from transformed structural data element S' to obtain structural data element S'' and storing internal identifier K in a file of internal identifiers FID ;

performing the steps of the conversion function upon a converted image M' comprised of a concatenation of the coded tag data element T'' and either transformed structural data element S' if internal identifier K was not extracted, or structural data element S'' if internal identifier K was extracted;

ing the encrypted final image G as a concatenation of the coded tag element T'' and either transformed structural data element S' if internal identifier K was not extracted, or structural data element S'' if internal identifier K was extracted.

27 64. The apparatus of claim 63, wherein:

the processor is adapted to communicate on a network; and

the computer executable process steps further comprise:
structurally converting the file of internal identifiers FID to obtain a converted file of internal identifiers FID' , wherein a tag data element formed during the structural conversion of the file of internal identifiers FID is coded with an external key selected stochastically from a multitude of external keys in an external key file K_{EXT} ; and
transmitting the encrypted final image G and structurally converted file of internal identifiers FID' to a subscriber or receiver.

65. An apparatus for structurally converting a binary sequence into an encrypted final image G , comprising:
a memory element for storing computer executable process steps;
a processor for executing computer executable process steps;
computer executable process steps comprising:
forming an image M of the binary sequence as a concatenation of a tag data element T and structural data element S , tag data element T comprising information necessary to reverse the conversion process, structural data element S comprising a sequence of logical scales of position coding;
selecting a number of conversion steps P to be performed;
iteratively executing P times a conversion function comprised of the following steps:

selecting a transformation algorithm A from a predefined set of transformation algorithms L ;

selecting an alphabet of transformation AV based upon the structural data element S ;

applying algorithm A and alphabet AV to structural data element S to form a plurality of logical scales of position coding;

forming a transformed structural data element S' comprised of a sequence of the logical scales of position coding;

stochastically selecting a bit length parameter and a shift parameter which define an internal identifier K within transformed structural data element S' ;

scrambling internal identifier K with a scrambling function to obtain a scrambled internal identifier K' ;

forming tag data element T ;

coding a portion of the tag data element T with scrambled internal identifier K' to obtain a partially coded tag data element T' ;

selecting an external key K^x ;

coding the partially coded tag data element T' with external key K^x to obtain coded tag data element T'' ;

stochastically determining whether to extract internal identifier K from transformed structural data element S' , and if determined necessary, extracting the internal identifier K from transformed structural data element S' to obtain structural data element S'' and storing scrambled internal identifier K' in a file of internal identifiers FID ;

performing the steps of the conversion function upon a converted image M' comprised of a concatenation of the coded tag data element T'' and either transformed structural data element S' if internal identifier K was not extracted, or

structural data element S'' if internal identifier K was extracted;

and forming the encrypted final image G as a concatenation of the coded tag data element T'' and either transformed structural data element S' if internal identifier K was not extracted, or structural data element S'' if internal identifier K was extracted.

8 66. The apparatus of claim 65, wherein:

the processor is adapted to communicate on a network; and

the computer executable process steps further comprise:

13 structurally converting the file of internal identifiers FID to obtain a
14 converted file of internal identifiers FID' , wherein a tag data
15 element formed during the structural conversion of the file of
16 internal identifiers FID is coded with an external key selected
17 stochastically from a multitude of external keys in an external key
18 file K_{EXT} ; and

transmitting the encrypted final image G and structurally converted file of internal identifiers FID' to a subscriber or receiver.

22 67. The apparatus of claim 62, wherein the external key K^x is selected from a
23 multitude of external keys in an external key file K_{EXT} .

25 68. The apparatus of claim 62, wherein the selection of external key K^x is a stochastic
26 selection.

28 69. The apparatus of claim 62, wherein a same external key K^x is selected for use in
29 all iterations.

3

4 71. The apparatus of claim 62, wherein the external key K^x is entered by a user during
5 the conversion and reverse conversion process.

6

7 72. The apparatus of claim 67, wherein:

8

9 the processor is adapted to communicate on a network; and

10

11 the computer executable process steps further comprise:

12

18

19 73. The apparatus of claim 62, wherein the selection of transformation algorithm A
20 may be a stochastic selection.

21

22 74. The apparatus of claim 62, wherein the selection of transformation algorithm A
23 may depend upon adherence to a mathematical criterion.

24

25 75. The apparatus of claim 62, wherein the selection of transformation algorithm A
26 may depend upon adherence to a logical criterion.

27

28 76. The apparatus of claim 62, wherein the selection of transformation algorithm A
29 may depend upon adherence to a file size criteria for encrypted final image G .

30

1 77. The apparatus of claim 62, wherein the predefined set of transformation
2 algorithms L may be supplemented.

3

4 78. The apparatus of claim 62, wherein the selection of a number of conversion steps
5 P may be a stochastic selection.

6

7 79. The apparatus of claim 62, wherein the selection of a number of conversion steps
8 P may depend upon adherence to a mathematical criterion.

9

10 80. The apparatus of claim 62, wherein the selection of a number of conversion steps
11 P may depend upon adherence to a logical criterion.

12

13 81. The apparatus of claim 62, wherein the selection of a number of conversion steps
14 P may depend upon adherence to a file size criteria for encrypted final image G .

15

16 82. The apparatus of claim 62, wherein the alphabet of transformation AV is
17 comprised of letters or quants, each letter or quant comprising a segment of
18 structural data element S .

19

20 83. The apparatus of claim 82, wherein a number of bits in each letter or quant is
21 stochastically selected.

22

23 84. The apparatus of claim 82, wherein a number of bits in each letter or quant may
24 depend upon adherence to a mathematical criterion.

25

26 85. The apparatus of claim 82, wherein a number of bits in each letter or quant may
27 depend upon adherence to a logical criterion.

28

29 86. The apparatus of claim 82, wherein a number of bits in each letter or quant may
30 depend upon adherence to a file size criteria for encrypted final image G .

1

2 87. The apparatus of claim 62, wherein the information necessary to reverse the
3 conversion process stored in tag data element T may comprise one or more of the
4 following:
5 an indicator of whether a current iterative step is the P^{th} iteration;
6 an indicator of whether the selected external key K^x is to be used for all P
7 iterations;
8 an indicator of the selected external key K^x ;
9 an indicator of the selected transformation algorithm A ;
10 a length of a first logical scale of position coding;
11 the alphabet of transformation AV ; and
12 other transformation algorithm A parameters.

13

14 88. The apparatus of claim 63, wherein the information necessary to reverse the
15 conversion process stored in tag data element T may comprise one or more of the
16 following:
17 an indicator of whether a current iterative step is the P^{th} iteration;
18 an indicator of whether the selected external key K^x is to be used for all P
19 iterations;
20 an indicator of the selected external key K^x ;
21 an indicator of the selected transformation algorithm A ;
22 the alphabet of transformation AV ;
23 a length of a first logical scale of position coding;
24 other transformation algorithm A parameters;
25 the bit internal identifier K length and shift parameters; and
26 an indicator of internal identifier K extraction.

27

28 89. The apparatus of claim 63, wherein the information necessary to reverse the
29 conversion process stored in tag data element T may comprise one or more of the
30 following:

1 an indicator of whether a current iterative step is the P^{th} iteration;
2 an indicator of whether the selected external key K^x is to be used for all P
3 iterations;
4 an indicator of the selected external key K^x ;
5 an indicator of the selected transformation algorithm A ;
6 the alphabet of transformation AV ;
7 a length of a first logical scale of position coding;
8 other transformation algorithm A parameters;
9 an indicator of the scrambling function selected;
10 the bit internal identifier K length and shift parameters; and
11 an indicator of internal identifier K extraction.

12

13 90. The apparatus of claim 65, wherein the scrambling function is selected from a
14 scrambling matrix comprised of a predefined set of scrambling functions.

15

16 91. The apparatus of claim 90, wherein the predefined set of scrambling functions is
17 changed periodically.

18

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